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## NOTES ON CARANGIN FISHES

### V.—YOUNG *TRACHURUS* IN THE GULF OF MEXICO

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In material from the Bingham Oceanographic Collection of Yale University kindly loaned me for examination by Dr. A. E. Parr, there are young *Trachurus* of 8 to 178 mm. standard length from the Gulf of Mexico.

Lütken, 1880 (*Spolia Atlantica*, Dansk. Vid. Selsk. Sk., [5] XII, p. 534) recorded *T. cuvieri* (equals *picturatus* Bowdich) from the West Indies, but Jordan and Evermann, 1896 (Fishes North and Middle America, I, Bull. U. S. Nat. Mus., XLVII, p. 910) say "It has not been recorded from the east coast of either North or South America, where *Trachurus trachurus* [not of Linnaeus, equals *lathami* Nichols] is the only well-known species, even this being rare." *Trachurus lathami* Nichols is now the only form of this genus generally recognized as occurring in the western Atlantic, and it was therefore unexpected to find two distinct forms, easily differentiable from about 15 mm. standard length upward, represented in these Gulf of Mexico young.

Referable to *Trachurus lathami* are 2 of 17 and 20 mm. standard length, March 6, about 26° 41' N., 88° 19' W., Atlantis 1935; 5 of 37 to 60 mm., March 8, Central Gulf of Mexico, Atlantis 1935; one of 24 mm., March 21, coastal waters 10 miles off mouth of Pensacola Bay, beneath *Cyanea*, 1935; one of 83 mm., March 25, 28° 36' N., 91° 02' W., Atlantis 1937; 2 of 145 and 178 mm., March 26, 28° 19' N., 91° 02' W., Atlantis 1937; 12 of 34 to 51 mm., March 27, about 28° 21' N., 90° 18' W., 1935; 4 of 14 to 35 mm., April 12, 24° 38' N., 83° 02' W., Atlantis 1935; 2 of 25 and 40 mm., April 16–18, Gulf of Mexico, Mabel Taylor 1932. These 29 specimens of which the 2 or 3 longest are probably young of the

preceding year, give an idea of growth changes in *Trachurus lathami*; and those of comparable size have been identified by comparison with the type of that form (No. 7351 Amer. Mus. Nat. Hist.). The smallest specimens compare with a poorly preserved series around 20 mm. long from the Gulf Stream off the Florida Keys in late February, previously referred to *lathami* (Nichols, 1920, Bull. Amer. Mus. Nat. Hist., XLII, p. 479).

The bend in the main lateral line where the anterior arch meets the posterior straight part is relatively abrupt at all sizes. The upper accessory lateral line may usually be seen to end abruptly under the front of the soft dorsal, and there is no indication of its continuing backward under that fin (specimens down to 25 mm. standard length). Dorsal soft rays (estimated in specimens down to 35 mm.) vary from 28 to 33 (average 30.3). Scutes (estimated in specimens down to 34 mm.) vary from 67 to 75 (average 70.1 1/2). At sizes from 17 to 25 mm. standard length (5 specimens), depth in this is 3 to 3.6 (average 3.38); head, 3 to 3.2 (3.07 1/2); eye in head, 2.8 to 3.2 (3); pectoral, 1.5; curve of lateral line (chord) in straight part, 1.3 to 1.5 (1.39). At from 34 to 40 mm. (7 specimens), depth is 3.5 to 4 (average 3.64); head, 3.1 to 3.5 (3.31 1/2); eye, 3.5 to 3.8 (3.61 1/2); pectoral, 1.3 to 1.6 (1.47); curve of lateral line, 1.3 to 1.5 (1.38 1/2). At from 41 to 50 mm. (7 specimens), depth is 3.5 to 3.8 (average 3.60); head, 3.2 to 3.5 (3.36); eye, 3.3 to 3.6 (3.51 1/2); pectoral, 1.3 to 1.5 (1.34); curve of lateral line, 1.3 to 1.5 (1.34). At from 51 to 60 mm. (5 specimens), depth is 3.5 to 3.7 (average 3.60); head, 3.4 to 3.6 (3.50); eye, 3.5 to 4

(3.68); pectoral, 1.2 to 1.4 (1.29); curve of lateral line, 1.2 to 1.4 (1.25). At from 83 to 178 mm. (3 specimens), depth is 3.8 to 4 (average 3.93); head, 3.4 to 3.6 (3.50); eye, 3 to 3.4 (3.13); pectoral, 0.9 to 1.1 (1.00); curve of lateral line, 1.2 to 1.4 (1.27).

Referable to a second species are 4 specimens of 17 to 21 mm. standard length, March 6, about  $26^{\circ} 41' N.$ ,  $88^{\circ} 19' W.$ , Atlantis 1935; 18 of 12 to 35 mm., March 8, Central Gulf of Mexico, Atlantis 1935; 4 of 14 to 24 mm., March 27-28,  $28^{\circ} 21' N.$ ,  $90^{\circ} 17' W.$  to  $27^{\circ} 28' N.$ ,  $92^{\circ} 13' W.$ , Atlantis 1935; 3 of 27 to 32 mm., March 28, about  $27^{\circ} 25' N.$ ,  $92^{\circ} 12' W.$ , 1935; 22 of 18 to 33 mm., April 11,  $26^{\circ} 35' N.$ ,  $85^{\circ} 33' W.$ , Atlantis 1935; also from the Caribbean, one of 20 mm., mid-February, off Panama, Atlantis 1934; 2 of 23 and 24 mm., April 26-27, Caymans to Rosalind Bank, Atlantis 1933. Here is an adequate series for comparison ranging from 14 to 35 mm. standard length. This form becomes more slender than *T. lathami* between 20 and 30 mm. The bend in the main lateral line is relatively gentle, its straight part relatively shorter, the most constant characters by which to differentiate it. The anterior scutes are less obvious than in *T. lathami* at comparable small sizes, very narrow at lengths of 30 mm. or less, and notably narrower than the posterior at 35 mm. A continuation of the upper accessory lateral line can frequently be traced well backward under the base of the soft dorsal fin. Though the material is too small for accurate counts, it seems at least to average a higher number of soft dorsal rays, 32 to 35, average 33.6 (estimated in 7 specimens of 25 to 30 mm.); a higher number of scutes, 76 to 87, average 80.9 (estimated in 8 specimens of 27 to 35 mm.).

At sizes from 12 to 20 mm. standard length (17 specimens), depth in this is 3.3 to 3.7 (average  $3.52 \frac{1}{2}$ ); head, 2.9 to 3.3 (3.07); eye in head, 2.6 to 3 (2.91); pectoral, 1.4 to 1.6 (1.51); curve of lateral line in straight part (smallest specimen 16 mm.), 1 to 1.3 (1.15). At from 21 to 25 mm. (14 specimens), depth is 3.5 to 4.1 (average 3.80); head, 3.1 to 3.3 (3.20); eye, 3 to 3.5 (3.16); pectoral, 1.5 to 1.7

(1.56); curve of lateral line, 1 to 1.2 (1.07). At sizes from 26 to 30 mm. (13 specimens), depth is 3.5 to 4.4 (average 3.97); head, 3.2 to 3.6 (3.30); eye, 3 to 3.6 (3.27  $\frac{1}{2}$ ); pectoral, 1.5 to 1.6 (1.51  $\frac{1}{2}$ ); curve of lateral line, 1 to 1.2 (1.07). At sizes from 32 to 35 mm. (4 specimens), depth is 4 to 4.3 (average  $4.12 \frac{1}{2}$ ); head, 3.2 to 3.6 (3.45); eye, 3.1 to 3.6 (3.40); pectoral, 1.5; curve of lateral line, 1 to 1.2 (1.07  $\frac{1}{2}$ ).

This material is too small for positive identification with grown fish without intermediate specimens, and unfortunately there is only one considerably larger specimen which may reasonably be referred to it. That specimen measures 75 mm. standard length, with depth 4.4, curve of lateral line in straight part 1.1; has 32 dorsal soft rays, 73 scutes, and upper accessory lateral line ending under front of soft dorsal. It has lower scutes and notably shorter ventral fins than *Trachurus lathami*, and is certainly not that species. Assuming that this is the same as the smaller specimens in series, and that it would be more slender at a larger size, it may also be assumed to be what Lütken identified as *Trachurus curvieri* (in the Atlantic equals *Trachurus picturatus*) from the West Indies (1880, *Spolia Atlantica, op. cit.*, p. 534), and it seems close to *picturatus*, but its scutes are definitely too few. In fact it differs from any recognized form except *declivis* Jenyns, 1842 (Nichols, 1920, not of McCulloch, 1915), of Australian seas, and one may safely assume it is not this. In view of our present knowledge it seems best to describe it as a western Atlantic representative of *Trachurus picturatus*.

#### *Trachurus picturatus binghami*, new subspecies

DESCRIPTION OF TYPE.—No. 15212 American Museum of Natural History, taken in the Gulf of Mexico,  $30^{\circ} 05' N.$ ,  $88^{\circ} 09' W.$  (St. 2812, 22 meters), March 20, 1937. Length to base of caudal, 75 mm. Depth in this length, 4.4; head, 3.5. Eye in head, 3.2; greatest width, 2.4; pectoral, 1.1; height of posterior scutes, 4. Curve of lateral line (chord) in straight part, 1.1. Height of anterior scutes in that of posterior, 1.3. Length of posterior scutes in their height, 5.5. Length of ventral in that of pectoral, 1.8.

Dorsal soft rays, 33; anal, 29. Scutes, 37 + 36.

Bend in lateral line where curve meets straight part rather gentle. Upper accessory lateral line ending under second soft ray of dorsal.

Color in preservative, gray along the back, pale below. Numerous dark punctulations on the middle of sides; a few scattered and well-marked ones on the upper gill-cover and below the eye.

Also referred to this species are numerous smaller specimens of 12 to 35 mm. standard length from 2 Caribbean and various Gulf of Mexico localities, taken in February, March and April (see p. 2). They are slenderer than the young of *Trachurus*

*lathami*, found in the Gulf of Mexico at the same season, with less abrupt bend in the lateral line and its anterior curved more nearly equal its posterior straight part; average more numerous soft dorsal rays and more numerous scutes. From 12 to 20 mm. their depth averages 3.52 1/2; 21 to 25 mm., 3.80; 26 to 30 mm., 3.97; 32 to 35 mm., 4.12 1/2. In *T. lathami* it averages in specimens of 17 to 25 mm., 3.38; 34 to 40 mm., 3.64; 41 to 50 mm., 3.60; 51 to 60 mm., 3.60; 83 to 178 mm., 3.93.

#### DISCUSSION

It will be noticed that in the *Trachurus* material here reviewed, 4 specimens, 3 *T. lathami* and the type of *T. binghami*, are of sizes sufficiently large to navigate independently of the currents. These were all taken close under the northern shore of the Gulf. The two larger *lathami* are labelled 28 1/2 fath., the other 12 1/2 fath.; and the *binghami*, 22 meters. They probably swim at a reasonable depth as much as or more than at the surface. These presumably represent an earlier age group than the smaller specimens.

The smaller specimens are variously labelled "sargassum collector" (the majority of cases); "from gulf weed" (one case); "2 meter specimen net, 11 P.M., surface" (one case, both species in this lot, and a number of specimens down to 8 mm., too small for determination); "beneath *Cyanea*" (1 case). They are at the surface and doubtless seek both weed and jellyfish as a hover; data of collection are not sufficiently detailed to say to what extent and which by preference. Concerning young *T. lathami* in the American Museum collections of about 20 mm., from the Gulf Stream off Key West, Florida, Feb. 23, 1910, I find in my field notes, "Many very small ones off shore in schools. Captured... Hot, light airs, weed and *Phytalia* off shore."

The absence of sizes of *T. lathami* between 25 and 34 mm. may be fortuitous, but suggests a temporary cessation of spawning, which might easily be referable to winter cold if spawning takes place in the northern part of the Gulf. There is

direct evidence that young of this form enter the Gulf Stream, which would account for its sporadic occurrence at a somewhat larger size on the Atlantic coast of the United States. The American Museum has a specimen of 117 mm. from the New Jersey shore where it was said to be very abundant in August, 1936. There is no direct evidence of its occurrence in the Caribbean. It is presumably regularly plentiful somewhere at larger sizes than have been taken so far, very likely in the Gulf of Mexico.

On the other hand, there is direct evidence that young *Trachurus p. binghami* occur in the Caribbean south to Panama, whence they might drift into the Gulf, but it probably also spawns there, and mostly later in the season than *lathami*, specimens of it in this collection being rather consistently smaller. There is no direct evidence that its young get into the Gulf Stream, and no specimens so identified from near Florida Strait.

Making some changes in their diagnosis with new data (see Nichols, 1920, "A Key to the species of *Trachurus*," Bull. Amer. Mus. Nat. Hist., XLII, pp. 477 to 481), the 7 recognized Atlantic forms of *Trachurus* may be differentiated as follows.

- (1) Upper accessory lateral line extending back under soft dorsal. Chord of curve of main lateral line appreciably shorter than straight part. Scutes relatively high, about 69 to 75 in number... See (2).  
Upper accessory lateral line stopping at front of soft dorsal..... See (4).
- (2) Comparatively deep and compressed, the depth 4.2 or less in grown fish... See (3).

More elongate, the depth 4.5 or more in grown fish.....*trachurus*.  
(3) Dorsal soft rays 30 or less.....*semispinosus*.  
Dorsal soft rays over 30.....*capensis*.  
(4) Comparatively deep and compressed, the depth 4.2 or less in grown fish. Dorsal soft rays usually 30 or less.....See (5).  
More elongate, little compressed, the depth 4.3 or more in grown fish. Dorsal soft rays more than 30. Chord of curve of main lateral line little if at all shorter than straight part.....See (6).  
(5) Scutes relatively high, 68 to 75.....*lathami*.  
Scutes relatively low, 79 to 92.....*mediterraneus*.  
(6) Scutes 73 to 87.....*binghami*.  
Scutes 90 to 108.....*picturatus*.

The systematic treatment of the forms of *Trachurus* is puzzling. They are sometimes so nearly identical from different oceans that authors synonymize them, but in no case where I have had material for comparison do they seem to me quite identical. They might all be races of a single widely distributed species, except that 2 quite unlike forms are often recognized in the same waters. To bring out

probable relationships I would make 3 or 4 forms races of *Trachurus trachurus* (Linnaeus), namely, *semispinosus* Nillson, 1832, of northern Europe; *capensis* Castelnau, 1861, of South Africa; *trachurus* Linnaeus, 1758, of the Mediterranean; perhaps also *mccullochi* Nichols, 1920, Australian seas.

Another 5 forms might stand as races of *Trachurus picturatus* (Bowdich): *picturatus* Bowdich, 1825, from the eastern North Atlantic; *binghami* Nichols, 1940, western North Atlantic; *symmetricus* Ayres, 1855, Pacific coast of North America; *murphyi* Nichols, 1920, Peru; *declivis* Jenyns, 1842 (Nichols, 1920, not of McCulloch, 1915), Australian seas. Two or 3 forms might be races of *Trachurus mediterraneus* (Steindachner), namely, *mediterranea* Steindachner, 1868, from the Mediterranean, occasional in the Atlantic; *lathami* Nichols, 1920, western North Atlantic; perhaps *japonicus* Temminck and Schlegel, 1844, Japanese and adjacent seas.